



Spectral Gamma-Ray Borehole Log Data Report

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Borehole

21-04-04

Log Event A

Borehole Information

Farm : <u>BX</u>	Tank : <u>BX-104</u>	Site Number : <u>299-E33-278</u>
N-Coord : <u>45,370</u>	W-Coord : <u>53,320</u>	TOC Elevation : <u>656.00</u>
Water Level, ft : <u>95.50</u>	Date Drilled : <u>5/2/1977</u>	

Casing Record

Type : <u>Steel-welded</u>	Thickness : <u>0.280</u>	ID, in. : <u>6</u>
Top Depth, ft. : <u>0</u>	Bottom Depth, ft. : <u>100</u>	

Borehole Notes:

Borehole 21-04-04 was drilled in April and May 1977 to a depth of 100 ft with 6-in. casing. The casing thickness is presumed to be 0.280 in., on the basis of the published thickness for schedule-40, 6-in. steel tubing. The drilling log indicates that the bottom of the borehole was grouted with 30 gal of cement grout. Although no information concerning perforations was available, it is assumed that the borehole was not perforated since this was not a routine practice during the early 1970s drilling campaign. The top of the casing, which is the zero reference for the SGLS, is about 0.5 ft below the ground surface. The top of the casing elevation was not available; therefore, the elevation was estimated from information provided in Brevick et al. (1994).

Equipment Information

Logging System : <u>1B</u>	Detector Type : <u>HPGe</u>	Detector Efficiency: <u>35.0 %</u>
Calibration Date : <u>02/1997</u>	Calibration Reference : <u>GJO-HAN-13</u>	Logging Procedure : <u>P-GJPO-1783</u>

Log Run Information

Log Run Number : <u>1</u>	Log Run Date : <u>05/15/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>0.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>40.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>

Log Run Number : <u>2</u>	Log Run Date : <u>05/16/1997</u>	Logging Engineer: <u>Alan Pearson</u>
Start Depth, ft.: <u>96.0</u>	Counting Time, sec.: <u>100</u>	L/R : <u>L</u> Shield : <u>N</u>
Finish Depth, ft. : <u>39.0</u>	MSA Interval, ft. : <u>0.5</u>	Log Speed, ft/min.: <u>n/a</u>



Borehole

21-04-04

Log Event A

Analysis Information

Analyst : D.L. Parker

Data Processing Reference : MAC-VZCP 1.7.9

Analysis Date : 10/03/1997

Analysis Notes :

This borehole was logged by the SGLS in two log runs. The pre- and post-survey field verification spectra met the acceptance criteria established for the peak shape and detector efficiency, confirming that the SGLS was operating within specifications. The energy calibration and peak-shape calibration from these spectra were used to establish the peak resolution and channel-to-energy parameters used in processing the spectra acquired during the logging operation. There was some gain drift during logging operations, and it was necessary to adjust the established channel-to-energy parameters during processing of log data to maintain proper peak identification.

Casing correction factors for a 0.280-in.-thick steel casing were applied during analysis.

The only man-made radionuclide detected around this borehole was Cs-137. The presence of Cs-137 was measured almost continuously from the ground surface to a depth of 39 ft. Two distinct zones of Cs-137 contamination were detected from 3 to 21 ft and 25 to 39 ft.

The K-40 concentration values increase at about 40 ft.

An analysis of the shape factors associated with applicable segments of the spectra was performed. The shape factors provide insights into the distribution of the Cs-137 contamination and into the nature of zones of elevated total count gamma-ray activity not attributable to gamma-emitting radionuclides.

Additional information and interpretations of log data are included in the main body of the Tank Summary Data Reports for tanks BX-101 and BX-104.

Log Plot Notes:

Separate log plots show the man-made and the naturally occurring radionuclides. The natural radionuclides can be used for lithology interpretations. The headings of the plots identify the specific gamma rays used to calculate the concentrations.

Uncertainty bars on the plots show the statistical uncertainties for the measurements as 95-percent confidence intervals. Open circles on the plots give the MDL. The MDL of a radionuclide represents the lowest concentration at which positive identification of a gamma-ray peak is statistically defensible.

A combination plot includes the man-made and natural radionuclides, the total gamma derived from the spectral data, and the Tank Farms gross gamma log. The gross gamma plot displays the latest available digital data. No attempt has been made to adjust the depths of the gross gamma logs to coincide with the SGLS data.

Plots of the spectrum shape factors are included. The plots are used as an interpretive tool to help determine the radial distribution of man-made contaminants around the borehole.